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Journal of the Society of Arts.

FRIDAY, MARCH 27, 1857.

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NOTICE TO CANDIDATES.

Persons who intend to offer themselves as Candidates at the Society's Examinations in June next, in London and at Huddersfield, are desired to take notice that no one will be admitted to the Examinations who shall not have sent in his "Return paper" to the Secretary of the Society of Arts, before Monday, the 20th of April next.

EXHIBITION OF INVENTIONS.

The Society's Ninth Annual Exhibition of Inventions was opened on Monday last, the 23rd instant. The Exhibition will be open every day till the 23rd of May, from 10 a.m. to 4 p.m., and is free to the members and their friends. Members, by tickets or by written order bearing their signature, may admit any number of friends.

PRIZES FOR ESSAYS ON MARINE ALGÆ AS FOOD FOR MAN AND DOMESTIC ANIMALS.

The following are the conditions relating to the competition for the prizes of £50 and £20 respectively, placed in the hands of the Council of the Society of Arts by Sir W. C. Trevelyan, Bart., to be awarded for "The two best and approved Essays on the applications of the Marine Algæ and their products, as food or medicine for man and domestic animals. Competitors must give the results of their original investigations on sea-weeds (especially on the chemistry of their nutrient principles); and they must prepare a series of specimens illustrative of the best modes of collecting, preserving, and preparing the nutritive species in a state fit for food. Mere compilations will not be admitted to competition."

Conditions.

1. The Essays, with accompanying specimens, to be sent to the Society of Arts by the 31st day of March, 1858. Each Essay to be marked "Essay on Marine Algæ," and to have a motto or distinctive mark attached, which mark must also be written on a sealed letter, containing the name and address of the author.

2. The Essays will be delivered by the Council of the Society to the adjudicators, who will fix a day for making their award, which will be more or less distant, according to the number and size of the Essays.

3. The letters containing the names and addresses of the authors will remain with the Society of Arts, and none will be opened except those bearing the mottoes or marks attached to the Essays to which the adjudicators award the Prizes.

4. The adjudicators shall not be expected to give any reasons for their award, beyond stating that in their judgment the Essays are the best that have been submitted to them upon the subject, and are worthy of the Prizes, nor shall they be expected to give any opinion as to the soundness of any sentiments or theories which the Essays may contain.

5. When the adjudicators are prepared to make their award, a special meeting of the Council shall be summoned, and the Chairman shall then open the letters which bear the mottoes or marks attached to the successful Essays, and the Secretary will then communicate with the authors.

6. That in case the authors of the successful Essays shall be unwilling to print and publish the Essays at their own expense, then the copyright shall belong to the Council of the Society of Arts, who may publish the whole or any part of them, as they may think proper.

7. That the specimens accompanying the successful Essays shall be the property of the Society of Arts.

8. That the unsuccessful Essays, with the accompanying specimens, shall be returned to their authors when claimed, with the seals of the letters unbroken.

9. That the number of the adjudicators to be appointed by the Council be not less than five.

10. The Council reserve to themselves the right of withholding the prize entirely, in the event of the adjudicators reporting that in their judgment no Essay sent in is deserving of the reward.

⁂ Each Essay must be written in a plain legible hand, and only on one side of the paper, and it is recommended that it be as brief as is consistent with the importance of the subject.

SIXTEENTH ORDINARY MEETING.

Wednesday, March 25, 1857.

The Sixteenth Ordinary Meeting of the One Hundred and Third Session was held on Wednesday, the 25th inst., Captain L. L. Boscawen Ibbetson, F.R.S., in the chair.

The Paper read was:—

ON A NEW SYSTEM OF NATURE PRINTING.

By Christopher Dresser.

The art which I have this evening the honour of bringing before you, though new in the practical world, is not without its history, and although new in the sphere just named, perhaps claims a descent from bygone ages. Before, however, we notice the origin of this art, it behoves us to mark the signification of the term "nature printing" as that will define the path which we this evening must tread. The art of nature printing has been defined as "a method of producing impressions of plants and other natural objects, in a manner so truthful that only a close inspection reveals the fact of their being copies;"* but, to our mind, this is rather the result of its greatest achievements—to us it merely implies printing from nature, or with nature, and in this light we wish to regard it this evening.

As this printing from nature, or "nature printing," is only in one sense new, its history, or a brief statement of its supposed origin and progress, may prove interesting and useful, as this, and this alone, can enable us to understand to what extent it is new, and the nature of any supposed improvements or alterations in this art which may be offered. The precise origin of nature printing, the period when discovered, and the name of its first discoverer, does not appear to be handed down to us. Of this fact we are, however, assured, that as far back as about 250 years a simple mode of producing impressions of plants upon paper was employed by naturalists, which process must be said to be that of "nature printing" in its primitive form.

The earliest mode with which we are acquainted of producing impressions of plants was this:—The plant, after being dried, was held over the smoke of a candle or oil lamp, when it became blackened by a deposit of soot, after which it was placed between two sheets of paper and rubbed with a smoothing-bone, which caused the soot to leave the prominences of the leaf and adhere to the paper. In this way an impression of the plant was produced. This method of procuring impressions was employed as early as the year A.D. 1650.

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* See transactions of the Royal Institution. Henry Bradbury, on "Nature Printing."

History appears to be silent upon nature printing during the next 50 years, but in the year 1707 Linnæus breaks the silence by alluding to the impressions taken by Hessel, from nature, who, at a later period, in conjunction with a bookseller, carried out this art to a considerable extent, they even opening an establishment for the production and sale of works thus illustrated.

The mode adopted for the production of these works differed from that of the former, the leaf or vegetable subject being now prepared by being dabbed with printer's ink or lamp-black, after which, it was placed between two sheets of paper, and subjected to flat pressure.

A new feature was at this period introduced, viz., that of colouring by hand the impressions thus produced, which, however, did not prove successful, it usually obliterating to a considerable extent, and sometimes almost totally, the nature print.

Various other allusions we find to similar modes of producing impressions of plants, which we will not notice particularly, as they would upon this occasion serve no other purpose than to show the transition of the art in its simple form downwards to later times.

Hitherto all the modes of producing impressions of plants have been similar, they all involving a preparation of the botanical subject with a black pigment, and the application of pressure to procure the transfer. No attempt, that we are aware of, was yet made to multiply the impressions produced, a new vegetable subject being used for every impression, or nearly so.

In the year 1833 we have nature printing again appearing, but in quite a new form, and it will be at once seen, as we relate the process now employed, that it is altogether a new discovery, and cannot be considered as any modification of the processes before known.

The process to which we allude, and which is as follows, was the discovery of Peter Kyhl, a Danish goldsmith. The vegetable subject, after being thoroughly dried, and thus freed from all moisture, was placed between a plate of polished steel and a thoroughly heated lead-plate, which were unitedly passed between steel rollers, by which operation the plant became pressed into the lead, thus producing in this soft metal a beautiful concave image of itself; he also substituted zinc, tin, and copper plates for the lead, but their hardness proved an obstacle, as the pressure necessary to indent these metals was necessarily sufficient to distort the plant. Though we have here an art originated, of such a valuable character, it is not at present applied to any great practical purposes, as its ingenious discoverer died the same year that he made known his invention.*

During the next fifteen years various experiments were made in nature printing, but, with all their merit, they fell short of producing practical results. The next step worthy of our notice relative to the advance of this art was the proposal of a new method, conceived by Professor Leydolt, of the Imperial Polytechnic Institution of Vienna, in the year 1849, of printing from agates in such a manner as to represent themselves in a truthful manner. His method is as follows:—The agate is exposed to the action of fluoric acid, the result of which is, certain of the concentric scales are decomposed, while others remain unaltered; after this, the surface is well washed with dilute hydrochloric acid and dried, then carefully blackened with printer's ink. A piece of paper is now placed upon the prepared stone and rubbed with a burnisher, by which operation an impression is produced. There is one objection, however, to this simple process, viz., that the parts which are black in the stone are represented white, and the parts that should be white are represented black; this is, however, now overcome by the surfaces being reversed; that is, the concave surfaces made convex, and the convex concave, which is effected by casting.

Dr. Ferguson Branson, of Sheffield, appears to have suggested the next advance of nature printing, by the proposal in his paper, read in the year 1851, before the members of this Society, of the application of the electrotype, which has since proved itself to be an essential feature in this art.

Although Dr. Branson was the first to propose the application of the electrotype to this art, he afterwards abandoned this process, fearing that it was too expensive and tedious to answer practical ends, substituting for it brass casts. His process was that of taking casts of the vegetable object in gutta-percha, and electrotyping or casting from such moulds, in order to produce printing plates.

About the year 1852, Dr. Branson again made experiments endeavouring to render nature printing a practical operation, and the mode he now adopted was that of taking impresssions upon Britannia metal, with a view of transferring them to stone, and after printing in neutral tint, to colour such impressions by hand. This, however, failed to produce any practical results.

The next step was taken in the Imperial printing office of Vienna. It appears that specimens of the results obtained in England were received by that office in the year 1851, or early in 1852, and that they attracted the attention of the director, who resolved to produce in some way like results.

The first experiment there made appears to have been casting with gutta-percha, as Dr. Branson had done, but as this material did not altogether answer, Andrew Worring, in whose hands it had been placed, proposed the substitution of soft lead for the gutta-percha, which he used in the manner that Kyhl formerly did, and with great success; but the specimens operated upon were lace; hence, not natural, therefore this was not "nature printing." Professor Haidinger, however, proposed the application of the process to plants, which suggestion Worring gladly availed himself of. After he had prepared the moulds, in the manner just described, he, by the agency of the electrotype, produced plates prepared for the printing press. This process was at once applied to practical purposes, and several botanical works have already been illustrated by this agency. This process was first patented in Austria in the year 1853, and since in England by Messrs. Bradbury and Evans.

There is one other form of nature printing of which I am unfortunately to a considerable extent ignorant: it is the process of Felix Abate, of Naples, for producing representations of the grains of wood as exhibited by sections. The process depends in a great measure upon heat, but the date of this discovery I am not acquainted with.* This is, we believe, a sketch of the advance of nature printing from its origin and most simple state, to the present time, at which it has acquired not only a practical form, but wonderful perfection.

As we have passed along, we have noticed four distinct forms of nature printing; none of which could have been copied from either of the other forms of this art; the first being that in which the object was prepared by being blackened by some agency; the second, the impressing of vegetable objects into soft metals; the third, the preparation of minerals, so as to render them capable of producing images of themselves; and the fourth, the preparation of wood, so as to render it capable of yielding impressions which are its true image; these are the distinct varieties, and we cannot but believe that here we have the basework of an edifice which is daily being reared, and which will ultimately cast a benign influence, not only upon the sciences, but over the whole of mankind.

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* This process appears to have been used in some way, as impressions of plants, &c., were, we believe, produced from plates thus prepared.

* Since I wrote this the Secretary has kindly informed me that this process was described in the Journal of this Society. It had altogether escaped my memory where I had seen it, therefore I could not refer to it.

We have not only noticed in this short history the four distinct varieties of this art just alluded to, but various modifications of some of the varieties; this we wish, however, to impress: that it is not necessary that each one who followed out any branch of this art was acquainted with the works of those who preceded him, nor, on the other hand, can we say that he was ignorant of their researches. We would not for one moment rob any man of the laurels which he has justly won. We believe that Dr. Branson was the first who suggested the application of the electrotype process for the production of printing plates from casts from nature, but it does not follow that because Dr. Branson suggested it, that Worring of Vienna was acquainted with that fact; and although Worring adopted Kyhl's mode of pressing objects into soft metal, it does not follow that he was acquainted with the works of his ancestors. We do not say that he was not acquainted with these experiments—neither can we justly say that he was.

Mr. Henry Bradbury, in his paper on "Nature Printing," found among the transaction of the Royal Institution, states that we are indebted to Kniphof, for the application of the process in its rude state; to Kyhl, for having first made use of steel rollers; to Branson, for the first suggestion of the electrotype; to Leydolt, for the remarkable results he obtained in the representation of flat objects of mineralogy; to Haidinger, for having promptly suggested the impression of a plant into a plate of metal at the very time the *modus operandi* had been provided; to Abate, for its application to the representation of different sorts of ornamental woods on paper, &c.; and to Worring, for his practical services in carrying out the plans of Leydolt and Haidinger. From this statement we at once perceive that he supposes each man to have been acquainted with the works of those who had gone before him, otherwise he would have given each credit for the discovery of the art which he practised, but to our mind it is improbable that each was acquainted with the works of his ancestors, for had Worring been acquainted with the experiments of Kyhl, it is scarcely probable that he would have permitted the thought to remain so long unworked out, also the plan which he proposed was one which would readily suggest itself to a man in his capacity, with his practical knowlege.

Respecting the relative value of these discoveries we must just say a word. On those modes of nature printing which offered no power of multiplying impressions, save by a direct printing from nature for each impression, little need be said, as they are, in a practical point of view, worthless; yet these we would not depreciate; on the contrary, we would cherish them as seeds from which results of high practical value may ultimately spring, and they are for private purposes beautiful, interesting, and valuable.

The process for producing fac-similes of minerals, &c., having now the power of producing an unlimited number of impressions, is invaluable, as is also the process of impressing objects into soft metal, and by the agency of the electrotype preparing from such soft metal plates, those which will produce impressions to an unlimited extent; but of the power of this last process we must speak more definitely. Mr. Henry Bradbury, the champion shall we call him, of this modification of the art of "nature printing" in this country, states that if anything but a *thoroughly dried* vegetable specimen be placed between the plates of soft lead and steel, it will be spread in all directions and distorted to an unlimited extent, without leaving any impression in the soft metal, save a most undesirable one; therefore, the use of *thoroughly dried* specimens, and those only, is a necessity of the process. To this drying there is this objection: that the texture, which often furnishes the most distinctive character of a plant, is frequently altogether destroyed; this objection is, unfortunately, somewhat formidable. Also the ordinary results of the process seem to indicate that an extremely hard and thick outline to the body depicted is also a necessity of the process, but we cannot see any reasons why this may not ultimately be removed. One other objection to this process is this; that the pressure necessary for the formation of the impression frequently shatters the specimen, the results of which are oftimes amusing; thus we remember, while perusing a folio of these productions, hunting all over the sheet of paper on which the object was printed to find the constituent parts of certain leaves of the plant there depicted. This is an objection which will always remain as a difficulty when tender plants are used, but which will not be felt when strong subjects such as ferns are operated upon. Having thus looked at the dark side of the question we turn the page over and look at the bright side, and we say that the triumph of this process consists in the just and beautiful way in which it represents the venation of vegetable objects, it often presenting perfect copies of leaves which are possessed of veins of almost microscopic fineness.

Having thus noticed the modes of nature printing at present known, and their relative value, we must enter upon the special object of this evening's meeting, viz., that of introducing a new process of "nature printing," or a new branch of this art, and we may say that we feel it a special honour to stand before this meeting upon such an occasion as the present, as in this institution Dr. Branson uttered his valuable suggestions which were taken up so warmly by the members of this Society.

The plan which we beg to propose is that of using any natural object, a leaf, or flowers for example, as a printing surface, and printing with it on a lithographic stone, or metallic plate or cylinder, and after subjecting them to the usual processes for rendering them fit for printing, taking impressions in the usual ways.*

The precise mode of procedure is as follows:—

1st. *The Lithographic Process.*

"We take a leaf, for example, and carefully dab it with lithographic ink, (which has been reduced by water to about the consistence of printers' ink,) by the agency of a dabber, which is made of fine soft muslin filled with cotton wool. To enable us to coat the leaf evenly with ink, a small quantity of the latter is placed on a piece of damp writing paper, which rests upon several sheets of damp paper or cloth, under which is situated a warm metallic disc, or warm water-trough; the object of this contrivance being to keep the ink in the required plastic condition. Now, by the agency of the dabber, the ink is spread evenly but thinly over the sheet of writing paper, and the leaf to be reproduced is placed upon it. The leaf is now dabbed with the ink dabber, the latter being renewed with ink from the surrounding paper, taking care not to have too much on the dabber. Having now prepared the leaf by giving it a thin and even coat of ink, it is placed with the prepared side downwards, on a lithographic stone which has been previously warmed so as not to "set" the ink upon the leaf. A sheet of paper is then laid over the leaf, and rubbed with the finger or with a soft pad, which presses the leaf in contact with the stone. Now, upon removing the paper and the leaf carefully, we have our impression upon the stone. The stone is now subjected to the usual lithographic processes, as if it were a drawing, and copies produced by the ordinary lithographic printing process."

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* This process was patented Dec. 22, 1855, and this description is extracted from the specification.

2nd. The Metallic plate process, printing from a raised metal surface like a wood-cut or type.

"We take a leaf and prepare it in the same manner as that just described, substituting, however, for the lithographic ink a composition made by melting together about equal quantities of "etching ground," "common tallow," or "Balsam of Judea" and "sweet oil" (or any like substances), which are well mixed by being rubbed on a slab with a pallet knife, and a porcelain or metallic plate for the sheet of writing paper, which plate is placed over warm water and coated with the composition described, by the agency of the dabber; the leaf is now prepared by being dabbed, in the above described manner. Having now prepared our leaf, it is laid upon the metallic plate, zinc for example, which has been slightly warmed. A piece of paper is now placed over the leaf and rubbed as before. Upon removing the paper and leaf we have a true impression of the latter upon our plate, therefore, all that now remains to be done is to remove the metallic ground surrounding the impression and intervening between its parts, which is accomplished by the well-known etching processes, as that of employing dilute acids, or by the agency of galvanism—the latter is preferable—one variety of which, adapted to our purpose, is fully described in the *Athenæum* of March the 8th, 1856. We now, having our plate engraved, and having a true image of the leaf convex, print it off as if it were type or a wood engraving."

3rd. The ordinary copper plate or cylinder process, the engraving being concave.

"We take a copper, or other metallic plate, and thinly coat it with "etching ground," just as if it were about to be etched upon. The leaf is now prepared by being dabbed with oil paint—that used by artists—which has been spread over a sheet of paper by the dabber; from this the latter is replenished with colour as above described. After dabbing the leaf we place it upon the etching ground, and lay a piece of paper over it, and rub it as before. We now remove the paper, and in about one minute the leaf also. Now where the oil paint has touched the "etching ground," the latter is dissolved, and is at once carefully wiped off with a soft rag, the copper now appearing through where the ground is removed. The plate is now washed with soap and water to remove all remaining grease, and then subjected to the usual etching processes. In this case the image of the leaf is concave, and is printed off by the usual copperplate printing process. When rollers or cylinders are employed instead of plates, the process followed is similar."

Having thus described in detail the process now proposed, we may perhaps be permitted a word on the origin of the thought and the progress of that thought to its present state. When quite a schoolboy a person showed me a book containing a number of black impressions of leaves, but he was unfortunately not possessed of sufficient generosity to enable him to impart the secret of the mode of their production, although its retention was to him of no value. With the usual determination of youth not to be outdone, a resolution was made to invent some plan of producing similar results. Just about this time a friend placed in my hands a small portion of some popular periodical containing directions for taking impressions of leaves, which were as follows:—"Oil a piece of paper, then smoke it over the flame of a lamp and rub the leaf upon it, after which press the leaf thus prepared between two pieces of paper." The experiment was tried, and although to an extent satisfactory, was not altogether congenial, as the process was not a very easy or cleanly operation. Perceiving that a leaf was capable of being blacked, and of thus yielding impressions, the operation was altered; a composition of lamp black and sweet oil was prepared, which was evenly spread over a sheet of foolscap paper by the agency of a dabber made of calico stuffed with cotton wool; the leaf was then placed upon the black paper and dabbed with the black dabber, which was replenished when necessary with black from the surrounding paper. These results became shortly so successful, that a book was prepared and a series of impressions of leaves thus produced, were duly mounted in it, and with a degree of pride the old friend was again visited who had before displayed the book of impressions. These new results were soon perused by the old friend, who immediately exclaimed, "They look like lithographs; how did you do them?" This was coming to the secret. A laugh was at first the only answer to his question, therefore an instantaneous offer was made of revealing the secret of the mode of production of the contents of the former book, if the secret of the production of the contents of the latter should be disclosed. The challenge was accepted, and after the process by which the latter had been produced was stated, the secret was revealed relative to the former, which was as follows:—The leaf was placed between two leather pads, such as are used by printers, which were coated with printers' ink, and after being duly dabbed, was pressed between two sheets of paper. It was soon learned that this was a common school-boy feat, and a feeling perhaps partially of outvieing, and partially of the value of such a process to a student of the Fine Arts, which was then my lot, led me to search for some way of producing similar results in colours. An attempt was made to substitute oil paint for the lamp black, but at first unsuccessfully; it was therefore given up as a failure. After the lapse of four or five years the process was again recurred to, and this time oil paints were used with success, when it was found that a little skill in manipulation was all that was necessary in order to produce satisfactory results. During the five years which elapsed between the first and second series of experiments, lithography had come under my notice; therefore, the substitution of lithographic ink for the substances formerly used, and of a lithographic stone for the under sheet of paper, readily suggested itself. This proposition was named to Dr. Playfair, who, from the results obtained with the oil paint, had no doubt of the success of the process proposed. Experiments were therefore commenced, which proved highly satisfactory. Upon the success of the results at this time obtained, Dr. Playfair suggested the patenting of the process while further experiments were being carried on. He then suggested the preparation of the leaf with a composition which should resist the action of acid, and printing upon metallic plates, cylinders, &c., which should then be etched by the ordinary processes. Experiments upon this branch of the art were immediately commenced, and Mr. Warren de la Rue kindly consented to carry out these experiments by etching the plates. However it was found that the ordinary mode of etching by acids did not answer, as before the ground was eaten away sufficiently to enable the convex figure of the leaf to be printed from as a wooden block, which was the intention, the finer parts were destroyed by the lateral action of the acid. The electrical etching was therefore resorted to, and the results thus obtained were highly satisfactory. The first specimens ever produced by this method are here before us. Other experiments were made, endeavouring to eat off by the agency of oils, "etching-ground," from a plate which had been covered with this substance, and then etching in the ordinary way so as to use the plate as an ordinary engraved copper-plate, the image being concave; but relative to the success of this process we can say little, as the results are at present to an extent uncertain.

This method of producing similar results seems, however, to bid fair for success, viz., that of taking the impression of the vegetable object in grease, upon a steel plate, and etching it, not very deeply, by electricity, then pressing this etching into soft copper (as is done in the preparation of cylinders for Calico printers,) after which the etching on the copper-plate or cylinder is deepened by the ordinary re-etching process.

It will be seen, from the statement of our processes here given, that we employ, as a primary thought, methods for producing images of vegetable structures long known; nevertheless ignorant as it may appear, I was totally ignorant of all other modes but my own, till Dr. Playfair called my attention to what had been done. Had I been introduced as a stranger to the two processes now patented in England, just before I learned the history of nature printing, I should have said that the earlier originated in the school-boy trick of copying seals by laying soft lead over a sealing wax impression and hitting it with a hammer, and the latter from the feat of dabbing leaves with printers' ink, performed by the same community. Let it not, however, be supposed that I claim the original thought, for as we have before seen, it was given by the works of a former experimentalist, the new feature proposed being merely a mode of multiplying impressions.

Various proposals were made for producing full colours, and light and shade, in these impressions; thus, hand blocks, &c., have been applied to the nature prints for this purpose; but these are deviations from the purport of this evening.

Relative to the capabilities of the processes now before us, we believe that they are greater than those of any other branches of this art. The power afforded of using living specimens, rather than dried ones, enables us to secure the true texture of the leaf, the impressions revealing at a glance whether the vegetable object was glabrous, or rough, or downy, hairy, &c., and impressions are thus produced which show every hair of the copied leaf; the power, however, is not denied of using specimens imported from abroad, for dried specimens are as easily used as others, but they necessarily yield the dried effect which can, however, be to an extent overcome in this process by wetting the leaf. This power is also afforded, which is one which must be admitted to be beyond the reach of all other processes, viz., that of producing impressions of such delicate things as the cells of plants.

We have taken the section of plants possessed of large cells, and produced impressions of them with almost the fineness of the original; the germination of the seed, the flower and the fruit of certain plants, we have been successful with. We need not state that there are some things which we cannot copy, but our present achievements will be admitted to be invaluable, especially the production of true images of natural objects convex upon a metallic plate, capable of being printed from in the ordinary type press.

A word must be said upon the cost of the process, as this necessarily influences the commercial value of all discoveries. Respecting the lithographic method, the whole expense may be said to be that of printing off the impressions, as the cost of the materials for one transfer of a leaf on to the stone is less than one half-penny, and the time necessary for producing the original figure on the stone is a few minutes. Both the other modes are about as speedy, with the exception of the etching, which, occupying rather more time, involves a little more labour and expense, which are, however, more than compensated for in the process for printing from raised copper figures, as the expense of printing off impressions is in this case extremely small. Owing to the durability of the blocks employed, the most expensive form of the process must be below that of the process at present employed.

I cannot conclude without thus publicly thanking Dr. Playfair for his great kindness in enabling me to bring out this subject, as well as for furthering my humble thoughts, relative to this and all other matters on which I have asked his aid; Mr. Warren De La Rue, for carrying on my experiments on metallic plates; Mr. Richard Redgrave, for valuable hints upon etching; both Sir William and Dr. Hooker, for supplying botanical specimens; and the Department of Science and Art generally, for much assistance. Only for these aids my endeavours must have been vain.

DISCUSSION.

Sir **CHARLES FOX** said that although, perhaps, a little wide of the subject before them, he might be permitted to mention that, somewhere about thirty years ago, a mode of making casts by means of elastic moulds was laid before the Society by his brother, Mr. Douglas Fox. The first casting was that of a stag's horn, made of a mixture of wax and white lead. The casting was sent to the Society of Arts, and by that Institution to Mr. Deville, one of the most celebrated casters of the day, who expressed a strong doubt with regard to the truth of the statement—that the casting was made from a mould having only two parts. In order to settle that question it was resolved to make another mould of this stag's horn, and to invite Mr. Deville to take the casting out of the mould himself. The mode of casting was this:—He took the stag's horn, and also some ordinary sewing-silk, which was dipped into melted glue; this was stuck lengthwise round the horn, in the line in which it was intended to divide the mould, and the glue was allowed to set. Then putting a fine coating of oil over the horn in every part, a quantity of glue was melted, and the horn was suspended in it, and it was left until it was cold; then, by means of withdrawing the sewing-silk, the mould was cut into two parts in the most perfect manner. The mould itself was then placed in a vessel of ice, in order to harden and cool it as much as possible, inasmuch as, the casting being of wax and white lead in a heated state, the glue mould was liable to be destroyed by the heat; when the mould was quite cold the ingredients for forming the casts were poured in, and in a moment afterwards turned out again, leaving only a thin coating of the wax and white lead inside the mould. This preserved the mould from injury by heat, and by repeating the process a cast of any desired thickness was obtained. This was sent in the mould to Mr. Deville, who took it out himself, and upon his report of the beauty and value of this process the Society awarded to Mr. Douglas Fox the large silver medal for his invention. While on the subject of experiments in casting, he (Sir Charles Fox) would mention some that he had made for the purpose of obtaining moulds from leaves so as to be able to print from them; and some very beautiful results were obtained. The process adopted was a very simple one. He took an open receiver of an air-pump, and placed upon it a slab of porous stone, previously dipped in water, and a partial vacuum having been obtained, a leaf also dipped in water, was then placed on the stone, and the slight pressure of the atmosphere laid the leaf down quite flat, but in a manner not to interfere with its delicate texture. A little plaster of Paris was then poured on the back of the leaf, then, by letting the air into the receiver, the plaster mould, with the leaf imbedded in it, could be removed. From this mould a second mould was taken, and then the ordinary stereotype plates produced, from which they could print in the manner of ordinary types, which it was well known was the cheapest mode of producing impressions. Now, in taking plaster casts from the delicate surface of a leaf, it was found to be very difficult to prevent the moulds being affected by air-holes, which in the casting produced what was technically termed by the stereotyper "picks." This difficulty was, however, surmounted in a simple way. It occurred to him that if he could cast the mould under water this might be remedied. He instantly acted upon the idea, and having mixed a small quantity of plaster of Paris, he placed it in water, and an hour or two afterwards he found that the plaster was a solid lump, having set under water.

He was thus enabled to cast his moulds under water, which were still somewhat imperfect from the effect of small globules of air; but, by the action of a little jet of water upon the leaf, an expedient suggested by his brother Dr. Fox, who called it a "water brush," the globules of air were instantly removed, and could be seen running away from every part of it. By this means he succeeded in getting moulds free from "picks," and by pouring the plaster upon the leaf while under water, the finest particles by falling to the bottom on to the face of the leaf, took an impression of very great delicacy. By this process he had taken castings of a Napoleon medal, and after ten consecutive operations, the last casting was nearly as perfect as the original.

Mr. Hanhart said he would confine his remarks more particularly to that portion of the paper which referred to manipulation upon the lithographic stone, and although giving Mr. Dresser full credit for the perseverance that had led him step by step to what he considered a new method of nature printing, he (Mr. Hanhart) must say that similar results had been arrived at before. They had probably noticed that the valentines exhibited in the stationers' shops, were often surrounded by a printed lace pattern, and when this kind of ornamentation was first introduced, now twenty or five and twenty years ago, these patterns were transferred without any drawing, from the lace itself. The mode of effecting it was to soak the lace in a solution of gum arabic; when nearly dry it was made to adhere to the stone, and lithographic ink was then passed over the whole surface, the gummed lace preventing the ink combining with that part of the stone which it covered. In this way the pattern was printed in white on a tinted ground; and though in this instance the pattern of the lace appeared in white, and the ground was made the printing surface, they would still see the bearing this method had upon the subject before them. The coating an object with lithographic ink and transferring it on stone, had also been done at various times, with more or less success. He (Mr. Hanhart) had seen last year in Paris a work on sea-weeds, consisting of a number of plates, which at first sight appeared to be produced by the process of nature printing, as practised by Mr. Henry Bradbury, but on close examination he found that it was a lithographic production, and was confident that the objects were made to transfer their image to the stone, in a similar manner to what had been shown that evening. Some of the plates of this work were very satisfactory; others were confused; the success evidently depending upon the peculiar nature of the plant, as is the case with the process when the specimen is made to impress its form and texture into a metal plate. Although reproductions of this kind were very interesting, yet when fair representations of a plant were required, recourse must still be had to a good drawing.

Mr. W. E. Newton had listened to the paper with great interest. He would, however, call attention to one or two omissions in it. The author had given a history of the art up to certain points, but he had not alluded to the experiments made by Mr. Wedgwood. Several years ago, that gentleman experimented upon the photographic process, and produced some very beautiful specimens from natural objects by the action of light. Mr. Dresser had also omitted to mention the more recent experiments made with daguerreotype plates, from which impressions could be printed.

Mr. Henry Twining remarked that upon examining some of the specimens on the table, he was struck with their delicacy and minuteness, compared with those exhibited in that room on a former occasion, and that delicacy probably arose from their being produced whilst the botanical specimens were moist, instead of in a dried state, as heretofore, and also from not having been compressed, which detracted from the softness and delicacy of the impression. The process here introduced, he conceived, would be of the greatest use for the illustration of botanical works, owing to its cheapness and the number of impressions that could be readily obtained. It would be useful also, he thought, to a certain extent, in supplying designs for ornamental art. He scarcely thought that the specimens on the table were adapted for that purpose, inasmuch as the great object was to produce copies of entire flowers and plants, rather than single leaves or parts of flowers, as in the specimens exhibited. If this could be accomplished, he considered it would be a great feature in promoting ornamental art of various kinds.

Mr. Pearsall said, that in the review of the nature-printing process the union of lithography with photography had been alluded to in terms of hope, but he did not gather whether the speakers viewed photo-lithography as a probability or as a possibility. He might, therefore, call the attention of those who were at the Glasgow meeting of the British Association, in Sept., 1855, to the full evidence of this having been accomplished in the two photo-lithographs at the Photographic Exhibition in Glasgow which excited much attention, and were so truthful that it required special examination to be convinced that they were not photographs. He believed that the subject was brought forward at the chemical section presided over by Dr. Lyon Playfair.*

The Chairman said that Mr. Dresser, in a most interesting manner, had shown the various methods that had been used to further so important a result as printing by nature, and which had brought the art to its present perfection, and many thanks were due to him for his researches. It was mentioned in a part of his paper, that during fifteen years, viz., from 1833 to 1849, no practical results were arrived at, notwithstanding various experiments. Perhaps a few specimens of some results brought out by him (the chairman) during these years, might not be uninteresting. In 1839 he happened to see one of the first daguerreotypes, and was immediately struck with the idea of the advantage of producing a similar result on paper as well as the being able to multiply them. He was then in Switzerland, and instantly set to work to make experiments on the subject. Professor Gerber, of Berne, was engaged also in the matter, with whom he put himself in communication, and partly adopting his method, and partly by his own individual experiments, succeeded in printing the book of plants now before the meeting; he therefore thought himself entitled to claim that (with the assistance of the Gerber method) he was the first to print by the sun. On showing this book to M. Arago, at Paris, he first learnt that Mr. Fox Talbot had just then taken out a patent on the same subject. He then turned his attention to engraving from nature, particularly by the aid of the oxyhydrogen microscope. In the September number of the *Westminster Review*, for the year 1840, two of his prints were inserted, the one a group of fossils on stone, showing the possibility of engraving from a drawing by nature of opaque and bulky objects; the other a madrepore, drawn in the oxyhydrogen microscope, and magnified twelve-and-a-half times. He next produced for the late Dr. Buckland, Dean of Westminster, in the short space of two days, a very minutely detailed drawing of a pentagonaster; and afterwards, a small perch, on copper, of its natural size. He then took one of the scales and enlarged it with the oxyhydrogen microscope, from $\frac{1}{10}$th of an inch to nearly four inches. He next attempted to make nature engrave as well as to draw. [The chairman here exhibited a small copper plate, which he stated to be both drawn and engraved by nature.] He considered that this result, though imperfect, showed that much might be done by further investigation. He had succeeded also in employing his new electrotype process for nature printing, but his researches were put a stop to by his being employed by government to make a geological survey of all the railroad cuttings in Great Britain. Lately, however, he had recommenced, and he hoped in a short time to bring before the public some novel and interesting experiments, in modelling and printing, &c., by nature combined with art. All these experiments, including the electrotype, were made between the years 1839 and 1844. The Chairman concluded by moving a vote of thanks to Mr. Dresser for the paper which he had read.

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* See the *Athenæum*, Sept. 22, 1853, p. 1093, where it is reported that a communication was made by Professor Ramsay, "On a Process for Obtaining Lithographs by the Photographic Process," this means having been employed by Mr. Robert McPherson, of Rome, to obtain the beautiful photo-lithographs in the Exhibition at the Buchanan-street Rooms. See also the report of the twenty-fifth meeting of the British Association, page 69.

A vote of thanks was passed to Mr. Dresser.

The paper was illustrated by a variety of impressions of leaves and flowers produced by Mr. Dresser's process.

The Secretary announced that on Wednesday evening next, April 1, a paper by the Rev. W. Rogers, "On the Trade, Habits, and Education of the Street Hawkers of London," would be read.

The Secretary has received the following letters, since the meeting was held:—

Sir,—Many of Mr. Dresser's processes are suggestive, and not without interest, but seem to me laudable endeavours to do, under difficulties, what has been better done before. As an artist, I may remark upon the great value of the process in affording natural forms for adaptation, and I trust that my friend Mr. Bradbury will some day give us a book of leaves with photographic portraits of the trees, a work that should form a text book, not alone to the botanist, but to artists of every class.

From the specimens of nature printed lace, exhibited by Mr. Taylor, of Nottingham, in 1851, to the Imperial Official Works of Vienna, there is a great step, but it was left to us to produce the most complete series of prints from nature yet obtained, I allude to the Ferns of Great Britain, from the Whitefriars Press, for which, I believe, the Emperor of Russia has just presented Mr. Henry Bradbury with a diamond ring.—I am, &c.,

JOHN LEIGHTON, Jun.

Sir,—Having been present last evening, on the occasion of Mr. Dresser's paper on "a New System of Nature Printing," allow me to make a few observations. It appears to me that this so-called new system presents no other feature than the reproduction, upon printing surfaces by modern scientific appliances, of a discarded result produced some 250 years back by a mere hand operation upon paper.

His endeavour is merely to perpetuate, by one or more printing processes, the simple but imperfect effect produced by the blacking a leaf with lamp-back or ink, and transferring the same to paper by hand-pressure. Everybody by this time is aware of the nature of this result—it may have served its purpose for a time—but, it will be acknowledged how imperfect and inadequate such a result is in this advanced age; and yet, Mr. Dresser comes forward with this as a new system of Nature Printing, not as a new result in the art. Mr. Dresser is content to retrograde, not to advance. He has also borrowed the early history of Nature Printing from my original paper on the subject, which appears in the transactions of the Royal Institution. Mr. Dresser also states, that in my having awarded merit to different individuals, such as Kniphof, Kyhl, Branson, Leydolt, Haidinger, Abate, and Worring, I must have supposed each man to have been acquainted with the works of those who had gone before him, otherwise, I should have given each credit for the discovery of the art which he practised. If Mr. Dresser had considered for a moment, he would at once have seen that the names of those men being placed in regular rotation, according to date, were quoted as to many historical land-marks in the subject.

Mr. Dresser is wrong in asserting that drying the specimen destroys the plant to such a formidable extent; it loses no more than is lost in the herbarium, while the Austrian metal pressure process brings to light what is not always seen in the simple herbarium. He is also wrong when he says that the metal pressure mode shatters specimens in an amusing manner. Specimens certainly have been shattered through unskilful manipulation, but this by no means constitutes a defect in the process; with regard to his assertion that this is a defect specially resulting in the case of tender plants, I can only reply that the most tender plants are the most applicable to the metal pressure process. Take the whole of the seaweeds, and also the most delicate fronded ferns, the perfectly undisturbed reproduction of which fine substances is truly marvellous.

Having on no occasion advanced any claim in Nature Printing further than pushing it into practical existence in this country, I have ventured upon the above remarks.

I remain, &c.,

HENRY BRADBURY.

STEAM SHIP ARITHMETIC.

Mr. Atherton has forwarded to the editor of the *Journal of the Society of Arts* the following letter addressed to the editor of the *Mechanics' Magazine*, and has requested it may be published as being connected with the subject matter of his papers which have been read before the Society:—

Sir,—With reference to the origin of the formula $\frac{V^3 \; D^{\frac{2}{3}}}{\text{Ind. h.p.}} = C$, and in reply to the remark of "A Constant Reader" in No. 1753 of the *Mechanics' Magazine*, namely, "I do not wish to under value Mr. Atherton's labours, and I think, on the other hand, he can hardly wish them to pass current as possessing a more original character than really belongs to them;" I am enabled to meet that remark by the follow-extract from "Steam-Ship Capability," page 9, wherein, referring to the formula $\frac{V^3 \; D^{\frac{3}{2}}}{\text{Ind. h.p.}} = C$, I express myself as follows, acknowledging its prior use:—

"The example set by the Admiralty in publishing and circulating a tabular record of the constructive elements and experimental trials of the screw ships of the Royal Navy, has not been met or responded to by any similar publication on the part of the proprietors of mercantile fleets. That this omission on the part of merchant steam-fleet proprietors, is injurious to their own interests, may be inferred from the great advantages which have resulted to mining interests generally, by reason of the periodical publication of the constructive elements and working operation of mine pumping engines; and the interests of steam-ship proprietors and of mine proprietors being analogous as regards the management of their motive power, it can scarcely be doubted that steam-ship efficiency would be greatly promoted by the engineering and ship-building rivalry that would unquestionably be consequent on the locomotive *duty* of all steam-ships being ascertained and numerically *ranked*, as is the working *duty* of the Cornish pumping engines. Notwithstanding, however, the interests that would be served by such comparisons of steam-ship performance, the published reports of mercantile steam-ship trials are generally so deficient of details as regards the ships' displacement at the time of trial and the working power of the engines corresponding to the speed attained, that such records rarely afford the complete data on which any conclusion as to the real merit of the vessel can be satisfactorily deduced, the test of relative merit being determined by the index number resulting from the formula $\frac{V^3 \ D^{\frac{2}{3}}}{\text{Ind. h.p.}}$, by which the screw ships of the Royal Navy have been compared."

My labour in this matter, which, so far as I know, is original, and was primarily brought before the public by my essay on "Steam-Ship Capability," consists in my having utilized this formula, so as to embrace the compound combinations of displacement, power, speed, and distance, in connection with the £ s. d. expenses incurred, thereby constituting a system of arithmetic adapted to the requirements of Mercantile Steam-Ship Service, by developing a process whereby merchants may calculate the prime-cost expenses of conveying cargo per ton weight as affected by different combinations of size of ship, length of passage, and speed required. I admit that this system of steam-ship arithmetic, as exemplified in Tables K. L. M., pages 78, 84, and 87, of "Steam Ship Capability," is, when once pointed out, a very simple affair, so much so, that I hope to see steam-ship arithmetic made a subject of rudimentary mercantile education, and an essential requirement on the part of every person who assumes the direction of steam-shipping affairs; and it was with this view that I followed up the subject by my papers read before the Society of Arts, London, 16th May, 1855, and 16th January, 1856, and by my paper on "Mercantile-Steam Transport Economy," read before the British Association, at their Cheltenham meeting in August last.

Your correspondent, "A Constant Reader," further objects to my having designated the co-efficient C, which results from the formula $\frac{V^3 \ D^{\frac{2}{3}}}{\text{Ind. H. P.}} = C$, as the index number of dynamic "duty," instead of using the term "performance," observing as follows:—

"The only use of the new term, that I can see, is to involve the origin of the formula in obscurity, and to give an appearance of novelty and originality to Mr. Atherton's labours to which they are not altogether entitled."

The foregoing explanation will, I hope, induce your correspondent to put a fresh construction on my motives. As to the nomenclature itself, by which I have endeavoured to develop and explain this system of "Steam Ship Arithmetic," I judged it to be appropriate to call the co-efficient C, on which the calculations are chiefly based, and which is not necessarily a constant number, when applied to vessels of different type, and not similarly circumstanced, by the term "index number," thereby implying its variability, and as the index number may be greater for a vessel of 500 tons displacement, such as H.M S. *Reynard*, than it is for a vessel of 5,000 tons displacement, such as H.M.S. *Duke of Wellington*, whilst the "performance" of a vessel of 500 tons could not, in the general acceptation of the term "performance," be conceived to be greater than the performance of a vessel of 5,000 tons, the term "performance" might, therefore, mislead, and this was one reason for my having denominated the co-efficient resulting from the formula referred to as the index number of "dynamic duty," rather than call it the index number of "performance." Moreover, by thus adopting the term "duty," the index number of dynamic duty indicates the degree of merit that may attach to the locomotive operation of a steam-ship, analogously to the sense in which the index number of working "duty" indicates the degree of merit which may be due to the principle and constructive operation of a Cornish pumping-engine, the relative working efficiency of which engines have, for fifty years past, been denoted by the term "duty." Following, therefore, the established precedent of nomenclature used for analogous objects, I have adopted the term "dynamic duty," in preference to the term "performance," and, for the reasons above stated, I regard it as the least liable to mislead others in their studying and prosecuting the system of steam-ship arithmetic which I have endeavoured to inculcate. The only question with me is, whether it ought not to be called the "Index Number of Constructive Merit," that is the term which would challenge discrimination between sound practice and empty pretension in steam-ship construction, and do most public good in the quickest time.

I remain, Sir, your very obedient servant,
CHARLES ATHERTON.

Woolwich Dockyard, March 17, 1857.

Home Correspondence.

THE ECONOMY OF FOOD.

Sir,—As the *Journal* is open to a more extended discussion on Dr. Letheby's paper, I avail myself of it to remark upon a few points relative to matters to which the subject, and more especially his observations, tended:—"*Sir, you have taken such a quantity of food, and we will have so much work out of you.*" Now, as far as the domain of matter lies, unconnected with mind, chemical science has done and must do immense service, not to be underrated, and Dr. Letheby's paper, as well as the great ability displayed, must have been appreciated by all who heard it. But his application, according to the above expression, shows that he has not given the same study to the mind, and how little he recognises its powers, although manifesting so liberal a share of them himself. In Dr. Letheby's application of the subject to the criminal, can he say there is no food spent in consequence of that criminal's mental activity? So far as the mere wear of those material organs which are affected by the mind is concerned, they will receive strength simultaneously with the bodily organs by taking proper and nourishing food. Now it is an undisputed fact that the person working with mind and body at the same time, is unable to give the pound of flesh back which Dr. Letheby puts into him, for, without his own will, the mind, if active, consumes its share. It is well-known that a man doing physical and mental work together, can only sustain labour a fourth part of the time of another working without thought or mental application, even in a mere handicraft sphere of action; and in philosophical reflection, upon abstract or extended subjects, the body is incapable of performing the slightest labour. I would not have troubled you with these observations if the unnatural idea of demanding back in such exact ratio the food consumed, may not have a dangerous influence on the employed, in perverting the minds of the unscrupulous and less learned. Then, what you apply to the prisoner may in many cases be applied to those who are only more fortunate in not being criminals. This is just the thing that the manufacturers, in a former discussion at the Society of Arts, contended for; that men without intelligence or skill worked harder and better than the skilled. The chemists and they would seem to harmonise, first to ignore the mind, and then to calculate as by the rule of three, so much food, so much power; so much food, so much work. What a calculation! $F : P. = f : x$, hence $x = \frac{P.\ f.}{F.}$ But, alas! it is forgotten that the term f. traverses through a machine of such complexity and variation that the most subtle mathematics cannot reach it, though applied by the highest philosophers in chemistry. It has been recommended by the council to study political economy; is it not as necessary to study mental philosophy with physiology in connection with daily practical life? This administering of food for a fixed return, reminds one of the phrenologists who proposed to marry couples according to the development of their bumps. It is not true that the scientific men in their enthusiastic zeal to make science do its utmost, step too often beyond its proper limits, so valuable otherwise, and thus impede its legitimate progress.

There are a few points still which should not be omitted; some persons require much food to support life and health, which food gives in proportion no muscular strength, so much of what they consume wasting, without as it appears doing its part to nourish. Others again consume less food, but gain in bulk, without the system deriving strength; while others, under whatever circumstances, can eat but very sparingly. Thus, some we find *weak*, some *strong*, and others falling between, being as it were normal. Are the first cases not pathological, and the last the only true healthy one, and, therefore, the only one for experiment.

Another point is, when the mind under great irritation or the influence of the passions, gives an impulse to bodily action, and both get diseased, death perhaps ensuing. It appears to me if physical science accomplishes so much in our industrial progress, mental and moral science should not be excluded. Then evidently naked physiology, chemistry, and calculating political economy as thus enforced will degenerate mankind. Let us well consider in dealing with quantitative propositions (pure materialism or utilitarianism), that the mind of man (infinite in its nature) bears the application but to a certain point, and if we overstep it, all our efforts become negative or destructive. Matter does not govern mind, but mind will govern matter.—I am, &c.,

H. WAMPEN.

March 21, 1857.

THE ECONOMY OF FOOD.

Sir,—I was unable this evening, when the subject of scurvy was under discussion, to bring before the attention of the meeting the fact that there are cases where, though lemon juice and preserved vegetables have been found unequal to the prevention or remedying of the disease, another means has still been found effectual for the desired cure. I have been informed by an officer of the Royal Navy, who has twice had the disease when in the Arctic regions, that his second attack developed itself and progressed in spite of the most diligent use of the two above-mentioned anti-scorbutics. His recovery from the affliction he attributes to his adoption of the following course. He drank blood as it flowed fresh from the opened veins of wild animals just slaughtered. On this story, and on the subject generally, I would make the following remarks:—

1. We should not interpret this one negative instance as invalidating the enormous weight of positive evidence which exists in favour of the virtues of lemon and lime juice, but as showing this much, viz., that the form in which the anti-scorbutic principle exists in the anti-scorbutics ordinarily found effectual, may be, occasionally, that is, in certain states of certain constitutions, a form unfitted to further the assimilation and utilization of the said principle.

2. Granting the inference that blood really was the anti-scorbutic agent here, it would seem that in its possession of the anti-scorbutic principle, and in this point alone, does it resemble the usual remedies. So that two concretes, wholly diverse, save in one particular—their common possession of one principle, have the power of producing one effect. The chemist would at once decide that he has but to isolate this principle to produce all the effects which the complex and concrete substances had been previously employed to bring about. But the practitioner who acted upon the advice of the analyst would find himself for once led into error by that most useful of his fellow labourers, and feel in his disappointment the truth of a principle several times alluded to this evening, viz., that though certain insoluble principles may be regarded as the causes of certain effects, yet they do not appear to produce them unless they be wrapped up in one or other concrete form—"Non ex singulorum virtutibus virtus composita semper potest explicari." For no one, we are told, has yet been found hardy enough to employ simple potash, isolated and unassisted by fresh vegetables, as a remedy in scurvy; and citric acid, I am given to understand, has failed, as indeed the history here given also would lead us to anticipate it would, when it really was employed by itself, and to the exclusion of the usual anti-scorbutic remedies.

3. The chemical practitioner has been led to believe in the omnipotence of active principles, and the superfluousness of concrete media.

First. By the consideration of the singular success which has followed the isolation of the several alkaloids.

Secondly. By that tendency of the human mind; that "Idolon Specus," which, as Lord Bacon again and again repeats, leads men to suppose in nature the existence of a greater simplicity of arrangement than really is to be found there, or than anything save our own *à priori* conceptions would lead us to infer.

I am, &c.,

GEORGE ROLLESTON, M.B.

Ely-place, March 18, 1857.

THE ECONOMY OF FOOD.

Sir,—In perusing the very valuable paper of Dr. Letheby and the subsequent discussion, an impression is left of a very unsatisfactory kind, as though the meeting had made up its mind that we must go on for ever and for ever in one eternal round under the dominion of the "Law of Prey," animal feeding upon animal and men upon all, the final receptacle of matter, not in its wrong place, but in a very unpleasant form.

I do not believe in it. Our instincts are against it, *i.e.*, our rationalised instincts, and the vegetarian movement, ill-considered as it may be, is but an outward utterance of the growing perception, that in slaying animals for our food in a condition of civilisation, we are more cruel than the hunters of savage life; for we slaughter our tame creatures, fed by our hands, while they only kill the *feras naturæ*. More than that—our artificial breeding of animals produces in them many kinds of artificial disorders which recoil on their devourers This would seem to indicate that animal food is only a provision for man in the hunter state of existence, with a sparse population. Measley pork, consumptive beef, and rotted mutton, are not calculated to produce virile strength and health; and dunghill poultry does not yield the quantity of flesh found in the woodland pheasant, while Leicester mutton is a miserable substitute for forest venison, the healthiest of all animal food. To feed all London on venison would require the conversion of the rest of England into a chase.

Dr. Carpenter says, that chemical food, prepared artificially, does not supply the place of the organised food prepared in the alembics of nature. Yet surely this is merely a proof of the imperfect condition of our chemistry, which has made more progress in analysis than in synthesis. It has not yet solved the mystery of the aromas, those subtle principles that appear to act like fluxes in forming the union between the living body and the applied dead matter—the process of assimilation. When we consider that only fifteen years back we knew nothing of the chemical elements in our food and the purposes they subserved, we may imagine that another ten year may give us the knowledge in which we are still lacking. We cannot yet turn vegetarians on the imperfect materials given us by nature, but we may possibly improve the vegetables by feeding them better while growing, as a preliminary step to further chemical research. But assuredly we shall sooner or later get rid of the humiliating process of making our bodies the living tomb of dead animal matter. I am not a member of the "vegetarian body," or a believer in an exclusive vegetable diet, or even a vegetable diet eked out with incipient animals —eggs and milk—but I think improved vegetables will be one step towards the abatement of the "Law of Prey," a law pertaining to men and animals in the wild state—

the tygrine condition—but not belonging to a condition of high civilisation.

There is an old adage—"What is one man's meat is another man's poison," and some even like corrosive sublimate. It is not merely the plastic and respiratory elements that are wanted in food, but the assimilating fluxes suited to each peculiar condition. The philosophy of the fluxes or aromas once made plain, caseine and coagulated albumen—in other words—hard cheese, hard boiled eggs, may prove as digestible and assimilable as any other food, and the chemical bases of food and vegetables quite as available as the organised products of nature,

I am, &c.,
W. BRIDGES ADAMS.

1, Adam-street, Adelphi, March 24, 1857.

Proceedings of Institutions.

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BOSTON.—At the annual meeting of the members of the Athenæum. held Feb. 20, 1857, Thomas Garfit, Esq., President, in the chair, the report for 1856 was read and adopted. The most important feature in the proceedings of the year 1856 is the acquisition of and removal to the new building—elegant and spacious premises, erected by the Corn Exchange Company. Few towns of the same population possess so commodious a building, devoted to such a purpose. The number of members has considerably augmented since the removal—upwards of 100 having being admitted into the Institution since the month of June. The present number is 505, being nearly double that at the formation of the Institution in 1851. The library has this year been increased to the extent of 850 volumes, the major part of which have been purchased, the remainder presented. Those purchased were selected with great care by a sub-committee, from the works of standard authors, on history, science, philosophy, poetry, &c. The works chosen are not of an amusing and ephemeral character, but of lasting interest and value. The issue of books and periodicals has been as follows:—London books 4,092 entries; own books 5,940 entries; periodicals 3,000 entries. The number of volumes had from the London library since last February is 474; the number now belonging to the Institution 3,000. The following lectures have been delivered; the attendance at each lecture numbering above 300;—"The Life and Poetry of Goldsmith," by the Rev. G. B. Blenkin, vicar; "Newspaper Literature," by Mr. Smyth; "The Life and Writings of J. Locke," by Dr. Cammack; "King Lear," by J. Coniugton, Esq., M.A.; "Habit," "Use is Second Nature," by the Rev. P. W. Clayden; several more lectures are promised; the thanks of the members being especially due to these gentlemen who so kindly and cordially respond to the solicitations of the committee. With reference to the classes, the committee express a hope that the examinations and certificates of merit, now organised and granted by the Society of Arts, may stimulate the young men of Boston, and induce them to devote a larger portion of their leisure to the acquisition of some special branch of knowledge; and they point, with much pleasure, to the honourable position occupied by a member of the Athenæum, Mr. Dawson, at the last year's examination. The financial position of the Institution, notwithstanding the very heavy and extraordinary expenses of the year, is satisfactory, a balance of £36 6s. 1½d. remaining to the credit of the Institution, after defraying all liabilities. The following gentlemen are the officers for the current year:—*President*—Thomas Garfit, Esq.; *Vice-Presidents*—J. Noble, Esq.; S. H. Jebb, Esq.; W. Garfit, Esq.; *Treasurer*—C. Wright, Esq.; *Honorary Secretary*—Mr. J. W. Bontoft; *Curators*—H. R. Gilson, Esq., and Mr. W. Veall; *Honorary Librarian*—Dr. Cammack; *Committee*—Rev. G. B. Blenkin, M.A., Rev. G. E. Pattenden, M.A., Rev. P. W. Clayden, Rev. T. W. Matthews, Rev. C. F. Newmarch, W. H. Adam, Esq., F. Cooke, Esq., F. T. White, Esq., F. L. Hopkins, Esq., W. E. Chapman, Esq., M. Staniland, Esq., T. Wise, Esq., T. Small, Esq., Surgeon, Mr. J. F. Smyth, Mr. J. G. Artindale, Mr. J. Noble, Jun., Mr. W. Greenwood, Mr. G. F. Bailey. Mr. C. Johnson, Mr. W. C. Bland, Mr. James Bontoft, Mr. A. Reynolds.

LEEDS.—Two lectures were recently delivered in the Mechanics' Institution and Literary Society, by P. L. Simmonds, Esq., of London, "On the Commercial Products of the Animal Kingdom." The lecturer is a gentleman well known from his numerous and valuable contributions to the commercial literature of the day. His discourses on both occasions were well illustrated by an extensive and varied collection of the raw materials of the animal kingdom, and their various application in the arts in many elegant and costly articles of manufacture. The lecture of Monday derived much enhanced usefulness and interest from the rich collection of furs and skins of the choicest kind from Mr. Simmonds's own private museum of trade products, and from specimens contributed by Mr. Roberts, furrier to the Hudson's Bay Company. The numerous applications of ivory, bone, tortoise-shell, &c., were also fully exemplified by very costly and magnificent examples of turning, carving, and inlaying, of Chinese, French and English manufacture, from the collection of Mr. W. Lund, of Fleet-street. Every specific head of discourse was copiously illustrated to the eye by rare as well as common specimens. The articles were grouped and classified so as to assist the explanations given. The animal products used in pharmacy, food preparations—such as condensed eggs, solidified milk, essence of beef, the tripang and edible bird's nest of the Chinese, &c., were described. The products of fisheries, birds, and insects, were also illustrated and described. Seldom, indeed, has an audience enjoyed so facile an opportunity of surveying at a glance the whole group of industrial and staple products of the animal kingdom, furnished by creatures, denizens of the earth, the air, and the sea. It was justly remarked by the lecturer, at the outset, that there are few subjects in which the public have so deep an interest, and concerning which they have as yet so little knowledge, as the extent of the trade and commerce in animal products, and of the varied uses to which they are applied. the continually changing sources of supply, the quantities consumed—their prices, preparations, and uses. The statistics of all the principal articles treated of were brought down to the latest date with a view of furnishing a more adequate notion of their immense importance to a trading and civilised community. Mr. Simmonds alluded to the neglect of the whale fishery by this country in more recent years, and to the very lucrative trade which was now carried on by the Americans in that branch of industry in the North Pacific Ocean. These valuable lectures were very attentively listened to, and at the conclusion of each the specimens were examined with great interest by the auditory.

PARLIAMENTARY REPORTS.

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SESSIONAL PRINTED PAPERS.

Par. No.

Delivered on the 12*th March*, 1857.

86. Surveyors, &c., of Stamps and Taxes—Return.
88. Assaults upon Women and Children—Return.
89. Dover Mails—Copies of Contracts.
94. History of Great Britain—Correspondence.
97. Committee of Selection—4th Report.
40. Bills—Portland Harbour.
43. ——— Racehorse Duty Act Amendment.
44. ——— Pauper Maintenance.
45. ——— Cinque Ports Act Amendment.
46. ——— Customs Duties (Amended).
38. Standing Orders for the Suspension of Private Bills.

Delivered on the 13th March, 1857.

66. Metropolitan Police—Accounts.
87. National Debt—Account.
31. Bill—Fiscal Affairs (Ireland).
Church Estates Commissioners—6th General Report.
Prisons in Scotland—18th Report of the General Board of Directors.

Delivered the 14th March, 1857.

19. Harbour, &c., Bills—XIX. Liverpool Town and Dock Dues (St. Helen's Canal and Railway Company)—Board of Trade Report.
103. Sir John M'Neill and Colonel Tulloch—Correspondence.
104. Standing Orders for the Suspension of Private Bills.
106. Mutiny Bill—Clauses 69 and 73.
61. Medical Museums—Return.

Delivered the 16th March, 1857.

25. Woods, Forests, and Land Revenues—Abstract Accounts.
95. Poor-rates (Metropolis)—Return.
47. Bill—Mr. Speaker's Retirement.
Ecclesiastical Commissioners for England—9th General Report.

Delivered the 17th March, 1857.

112. Canada—Extract of Royal Commission.
112. Hudson's Bay Company—Copy of a Despatch.
Births, Deaths, and Marriages in Scotland—2nd Annual Report of the Registrar-General.

Delivered on 18th March, 1857.

45. Local Acts (XIV. Waterford and Tramore Railway; XV. Herne Bay and Faversham Railway; XVI. Fawnhope and Holme Lacy Bridge)—Admiralty Reports.
100. Bankruptcy—Abstract of Returns.
108. Order of Victoria—Copy of the Royal Warrant.
109. Paper Mills—Return.
Customs—1st Report of the Commissioners.
Charity Commission—4th Report.

Delivered on the 19th, 20th, and 21st March, 1857.

102. Camp at Colchester—Copy of Correspondence.
115. East India and China Association of Liverpool—Correspondence.
136. Supply—Account of sums voted, &c.
105. Wheat, &c.—Returns.
107. Public Monies—Report from the Committee.
114. Bills of Exchange Act, &c.—Returns.
123. Library of the House of Commons—Report from the Committee.
131. Three per Cent. Consols—Account.
140. East India (Oude)—Return.
141. British and Foreign Vessels—Return.
45. Local Acts (18. Swansea Harbour Trust and Swansea Dock Company; 19. Sittingbourne and Sheerness Railway; 20. Tweed Fisheries; 21. Tweed River Fisheries; 22. Dartmouth and Torbay Railway)—Admiralty Reports.
323. (Session 1856.) Church Rates—Return (corrected pages).

Delivered on the 18th March, 1857.

Public General Acts, cap. 1, 2, 3, 4.

MEETINGS FOR THE ENSUING WEEK.

Mon. Actuaries, 7.
London Inst., 7. Rev. H. Christmas, "On the History and Antiquities of Heraldry; and on some other branches of British Archæology."
Tues. Royal Inst., 3. Prof. Huxley, "On the Principles of Natural History."
Chemical, 8. Anniversary.
Civil Engineers, 8. I. Renewed Discussion "On High-speed Navigation, &c." And if time permits—II. Mr. F. R. Conder, "On the Permanent Way of the Bordeaux and Bayonne Railway, across the Grandes Landes."
Wed. London Inst., 3. Mr. E. W. Brayley, "On Mineralogy and Crystallography."
Society of Arts, 8. Rev. W. Rogers, "On the Trade, Habits, and Education of the Street-Hawkers of London."
Pharmaceutical, 8½.
Royal Soc. Lit., 8½.
Thurs. Royal Inst., 3. Prof. Tyndall, "On Sound."
London Inst., 7. Rev. C. Boutell, "On the Monumental Memorials and Engraved Monumental Brasses of Great Britain."
Philological, 8.
Photographic, 8.
Antiquaries, 8.
Royal, 8½.
Fri. Archæological Inst., 4.
Royal, 8½. Rev. J. Barlow, "On some Modifications of Woody Fibre, and their applications."
Sat. London Inst., 3. Prof. Robert Bentley, "On Systematic Botany, with especial reference to the natural systems of arrangement."
Royal Inst., 3. Prof. Huxley, "On the Principles of Natural History."
Medical, 8.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, March 20th, 1857.*]

Dated 29th December, 1856.

3086. William Renwick Bowditch, Wakefield, York—Improvements in the manufacture of a compound to be used as a varnish for water colours, and as a carrier for water colours or paints.

Dated 19th January, 1857.

154. John Haswell, Vienna—Improvements in the construction of railway carriages, which improvements are also applicable to locomotive steam engines.

Dated 4th February, 1857.

322. Felix Moreau, Paris—Recovering the fatty matters from coom or dirty axle-grease and lubricating oils, thereby rendering them fit to be used again.

Dated 11th February, 1857.

399. Achille Constantin Dandraut, 19, Rue Neuve des Petits Champs, Paris (now at 20, Earl-street, Blackfriars-road)—Preserving organised animal and vegetable matters, especially alimentary substances.

Dated 12th February, 1857.

417. William Edward Newton, 66, Chancery-lane—Improved machinery for cutting metals or other hard substances. (A communication.)

Dated 13th February, 1857.

422. Charles Crossley, Dan Leeming, and John Crossley, Halifax—Improvements in apparatus for heating and in taps to be employed in combination therewith, which taps are also applicable for general purposes.
432. George Hardstaff, Skegby Colliery, near Mansfield—Improvements in apparatus for actuating and applying the breaks of carriages used on railways, and coupling such carriages.

Dated 19th February, 1857.

482. Lot Wilks, 18, Bedford-row—An apparatus for signalling between the guards and engine drivers on railway trains, which is also applicable to other similar purposes.

Dated 20th February, 1857.

494. Henry Thomas Hellyer, Ryde—Improvements in the construction of bridges and arched structures.
498. John Rowland Crook, Birmingham—An improved material for, and an improvement in, the manufacture of hat tips, which material is also applicable to the manufacture of hat and other boxes or cases.

Dated 23rd February, 1857.

528. John Kirkham, Tonbridge-place, New-road—Improvements in the construction of furnaces, ovens, or kilns, for drying, baking, or burning pottery or earthenware, bricks, tiles, or other similar articles, and in the means of collecting and condensing or carrying off the smoke, gases, or vapours evolved from such or other furnaces or fire-places, or that escape or arise from the retorts and other parts of the apparatus used in the manufacture of gas.

Dated 25th February, 1857.

556. John Henry Johnson, 47, Lincoln's-inn-fields, and 166, Buchanan-street, Glasgow—Improvements in carding machines. (A communication.)
558. James Spence, Park-terrace, Brixton-road, Surrey—An improvement in the manufacture of artificial coral.

Dated 26th February, 1857.

560. John Henry Glew, 18, Charlotte-street, St. Pancras—An improved method of fastening ladies' and gentlemen's boots and shoes.
562. William Edward Wiley, Birmingham—Improvements in ever-pointed pencil-cases.
564. Joseph Hoy, sen., Islington—Improvements in apparatus for distributing sand on railway rails.
566. Charles Bruton, sen., Charles Bruton, jun., Francis James Bruton, and Samuel Rogers Bruton, Manchester—An improved azure blue for domestic purposes.
568. William Mills, 2, Lower Craven-place, Kentish-town—An improvement in the action of upright pianofortes.
570. Victor Cassaignes, 10, Queen-street, Golden-square—Improvements in the manufacture of metallic pens and pen-holders.
572. Nathaniel Jones Amies, Manchester—Certain improvements in machinery or apparatus for polishing and finishing yarns or threads.

Dated 27th February, 1857.

574. David Davies, Wigmore-street, Cavendish-square—An improvement in steps for carriages.
576. William Wilkinson, Nottingham—Improvements in lighting, and in lamps.
580. James Richard Field, 114 and 115, Fore-street, Cripplegate, Julius Goodman, and Louis Goodman, 41, Great Prescott-street, Goodman's-fields—Certain improvements in trousers.
582. Alfred Vincent Newton, 66, Chancery-lane—An improvement in springs for railroad carriages and other uses. (A communication.)

Dated 27th February, 1857.

584. Frederick Stubbin, Bawtry, Yorkshire—Improvements in propelling vessels.
586. Anguish Honour Augustus Durant, Conservative Club, St. James's-street—Improvements in apparatus for ascertaining and indicating the number of, and distance travelled by, passengers in public carriages, and the fares paid.
588. Charles Weightman Harrison, Woolwich—Improvements in obtaining light by electricity.
590. George Wilson, Glasgow—Improvements in weaving.
592. Henry Whatley Tyler, 12, Norfolk-crescent, Hyde-park—Improvements in the permanent way of railways.
596. Henry Duncan Preston Cunningham, Bury—An improvement in sails, and in the reefing and furling of sails, and setting and taking in of sails.

Dated 2nd March, 1857.

598. James Murphy, Newport, Monmouth—Improvements in securing screw nuts on their bolts, and bolts in plates.

600. Charles James Parry and William Briddon, Manchester—A certain improvement in the manufacture of shirt collars.

602. Frederick Decastro Jones, 29, Tavistock street, Covent-garden—An improvement in the construction of the bits of horses. (A communication.)

604. Edwin Francis Jones, Redcar, Yorkshire—Improvements in the manufacture of pig and bar iron.

606. Thomas Rose, jun., Botany Bay Farm, Hilgay Fen, Norfolk—Improvements in apparatus for cutting or disintegrating vegetable substances.

608. Charles Pauvert, Chatellerault, France—Certain improvements in manufacturing iron.

610. Charles Pauvert, Chatellerault—Certain improvements in manufacturing steel and cast steel.

612. Richard Archibald Brooman, 166, Fleet-steeet—A method of constructing and heating buildings and apparatus for the winding of silk from the cocoon. (A communication.)

614. William Brown, Gresham-street—An improved mode of preparing tapes for the market.

616. Thomas Gray, Rose-lane, Stepney—Improvements in separating vegetable fibres from mixed fabrics.

Dated 3rd March, 1857.

620. William Leuchars, 38, Piccadilly—Improvements in locks for travelling bags, portfolios, despatch boxes, and such like depositaries.

622. Edward Lindner, New York—Improvements in cartridges and bullets, together with an apparatus for producing the same.

624. William Edward Newton, 66, Chancery-lane—Improved means for preventing the forgery or imitation of bank-notes, bills, certificates, cheques, bonds, deeds, and other like articles. (A communication.)

626. William Edward Newton, 66, Chancery-lane—A preparation of materials for coating roofs or other portions of buildings to render them impervious to wet. (A communication.)

628. William Adam and John Stewart Templeton, Glasgow—Improvements in weaving looped and pile fabrics.

Dated 4th March, 1857.

631. Gerard Ralston, 21, Tokenhouse-yard—Improvements in fire-arms, and in balls or projectiles. (A communication.)

633. William Hartley and Thomas Hardman Farrar, Bolton—Improvements in looms.

635. Henry Lawrence De Zeng, Geneva, New York—Improvements in marine and fog signals, for reefs and other locations.

627. John William Heinke, Great Portland-street—An improved construction of diving bell.

Dated 5th March, 1857.

639. George Walter Dyson, Tinsley, near Sheffield—Tilting iron and steel or any other malleable substance by perpendicular motion.

641. William Muir, Glasgow—Improvements in generating steam for marine purposes.

643. Samuel Sutcliffe and James Stocks, Manningham, Bradford, Yorkshire—Improvements in means or apparatus in connection with steam-boiler and other furnaces to facilitate the consumption of smoke therein.

645. Hugh Greaves, New Palace-yard—Improvements in the mode of coupling or connecting pipes, columns, and conduits in the machinery for manufacturing the hoops to be used in connecting such pipes and columns, and in the shape of such pipes, columns, and couduits, whereby they become adapted for the support and conveyance of vehicles.

649. George Bower, St. Neots—Improvements in apparatus for manufacturing gas.

651. William Travis, Crompton, Prestwich-cum-Oldham, Lancashire—Improvements in furnaces.

653. James Kinder Cheetham and Thomas Southworth, Rochdale—Improvements in the use or application of certain substances for sizeing or finishing yarn or thread, also applicable for sizeing or stiffening woven and other fabrics.

655. Richard Atkinson Coward, Laurence Pountney-lane—Improvements in screw or submerged propellers.

Dated 6th March, 1857.

657. Francis Alton Calvert, Manchester—Improvements in machinery for ginning cotton and for cleaning and carding cotton and other fibrous materials.

659. Luke Barton, Ison Green, near Nottingham, and Edwin Stanley Brookes, Nottingham—Improvements in the manufacture of knitted fabrics.

661. William Petrie, Woolwich—Improved means of and apparatuses for creating or increasing draughts and currents.

Dated 7th March, 1857.

663. Rowland Mason Ordish, St. Mark's-crescent, Regent's-park—Improvements in suspension bridges.

665. Josiah Parkes, 11, Great College-street, Westminster—An improved apparatus for locomotive purposes.

667. Charles Lungley, Deptford Green Dockyard—An improved mode of constructing dry docks and basins for the stowage of ships.

669. Georges Antoine Tabourin, Lyons, France—An improved rotative engine.

Dated 9th March, 1857.

675. Clement Sharp, Birmingham—A new or improved manufacture of ships' thimbles and other metallic fittings used for rigging and sails and rope gearing in general.

679. George Davies, 1, Searle-street, Lincoln's-inn, and 28, St. Enoch-square, Glasgow—An improved self-inking stamp for printing cards, labels, and other articles. (A communication.)

681. Samuel Faulkner, Manchester—Certain improvements in machinery or apparatus for carding cotton and other fibrous substances.

683. Henry Richard Smith, Wellingborough—Certain improvements in manufacturing and purifying gas made from coal or other bituminous substances for illumination.

685. Charles Colton Dennett, Nottingham—A new construction of floors and ceilings of buildings.

687. William Edward Newton, 66, Chancery-lane—Improved machinery for cutting screw threads. (A communication.)

689. Alfred Vincent Newton, 66, Chancery-lane—An improved construction of rudder. (A communication).

691. Andrew Knox, Mile-end, and Thomas Robson, Aldersgate-street—An improved gas regulator.

693. William Charles Theodore Schaeffer, Stanningly, near Leeds—Improvements in treating the waste waters of woollen and other mills.

695. James Edward Duyck, West Farleigh, Kent—An improvement in treating cotton seed, in order to extract colour from the oil obtained therefrom.

Dated 10th March, 1857.

697. Johannes Neuenschwander, Albion-wharf, Kensington-basin, Kensington—Improvements in the process of preserving milk.

699. Charles Reynaud, Lyons, and 2, Catherine-street, Strand—Improvements in the application of india-rubber springs to mattresses, sofas, chairs, and other cushions or articles of furniture. (Partly a communication.)

701. Charles Baylis, Poultry—An improved method of constructing and arranging roads and ways, particularly applicable to populous cities and crowded thoroughfares.

INVENTION WITH COMPLETE SPECIFICATION FILED.

735. William Pidding, New Kent-road—Improvements in machinery or apparatus for the manufacture of piled fabrics, whether plain or figured.—16th March, 1857.

WEEKLY LIST OF PATENTS SEALED.

March 20th.

2227. Francis Wrigley.
2233. Andrew Barrie.
2237. Peter William Barlow.
2295. James Begg.
2305. Edwin Hardon and Joseph Henry.
2327. Alexis Picard.
2352. Francis Whitehead.
2371. Lewis Jacob Jordan.
2397. Giovanni Battista Piatti.
2403. Richard Archibald Brooman.
2413. George Hazeldine.
2481. Frederick Walton.
2515. Benjamin Ferrey.
2605. William Seed and William Ryder.
2701. Henry Hawkes Fox.
2727. William Brindley.
2863. Phillipp Kurten.
72. John James Russell and Joseph Bennett Howell.
111. François Auguste Verdeil, and Edmund Michel.
247. George Cranstoun Trotter Cranstoun, Geo. Young, and John Lovell.

March 24th.

2254. Claude Langlois.
2259. George Gower Woodward.
2263. George Neall.
2269. Joseph Edwards.
2275. James Noble Ward.
2277. Mathew Hickson.
2279. Robert Morrison.
2292. George Flint, Thomas Wood and Edward Wood.
2320. David Ogilvy Boyd.
2334. Herbert Mackworth.
2384. William Caswell Watson.
2385. Anton Bruno Seithen.
2429. William Jeffrey.
2444. Isidore Delcambre.
2494. Leonard Alexander Desachy.
2520. James Fenton.
2552. Henry Holcroft.
2923. Hector Mottet.
2939. Richard Emery.
2978. William Frederick Thomas.
124. Charles Wye Williams.
153. Thomas Sagar.
211. Pier Alberto Balestrini.
257. George Fergusson Wilson.
295. Astley Paston Price.

PATENTS ON WHICH THE THIRD YEAR'S STAMP DUTY HAS BEEN PAID.

March 16th.

640. Alexander Henry.

March 17th.

646. John Hick.
649. Perceval Moses Parsons.
667. James Hansor.

March 18th.

695. John Jeys.
791. Charles De Bergue.

March 19th.

658. Claude Adrien Bernard Chenot.
668. John Polson.
702. Thomas John Smith and Joseph Smith.

March 20th.

689. Stephen Holman.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
3955	March 1.	Crystal Lamp	John Jefferies Stone	London.
3956	,, 14.	Improved Smut and Chaffing Machine	John Coulson and Co.	Grantham.
3957	,, 20.	Shirt Collar	Walter Leigh	4, Glengall-grove, Old Kent-road.
3958	,, 21.	The People's Portable Stereoscope	Moran and Quin	65A, Poland-street, Oxford-street.
3959	,, 23.	Ventilated Waterproof Cap Life Buoy, &c.	George Bayley	37, Upper Thames-street.